

Remarks/Amendments

Applicant would first like to thank the Examiner for his comments made during the previously held interview. The Examiner's willingness to work toward the common goal of the allowance of this application during that interview is greatly appreciated.

This paper addresses the issues raised in the Office Action mailed 13 July 2006. This amendment is submitted in compliance with the guidelines of the revised amendment practice. See 1267 Off. Gazette 106.

Claims 1-3, 6-14 and 18-26 are currently pending. In the Office Action, Claims 2 and 3 were objected to as being of improper dependant form. Claims 1-3, 6-10, 14, 23, 24, and 26 were rejected under 35 U.S.C. § 102(b) as being anticipated by Begault (NASA-TM-102279 hereinafter "Techniques"). Claim 11 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Techniques in view of Maher (U.S. Pat. 6,111,958). Claims 12 and 13 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Techniques in view of Shamma (U.S. Pat. 3,848,092).

Claims 18-22 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Slater (USPN 4,941,187) in view of Begault (U.S. Pat. 5,438,623). Claim 25 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Techniques in view of Sommer (U.S. Pat. 4,434,508).

Claims 1, 7, 14, 18, 23 and 24 have been amended. Claims 2 and 3 have been cancelled. Claims 6, 8-13, 25 and 26 have been cancelled and rewritten as new dependant claims 27-35, respectively. No new matter has been added. As set out below, Applicant respectfully submits that the present invention as claimed is patentable over the cited art and urges the Examiner to reconsider the pending rejections.

Claim Objection

In the Office Action, Claims 2 and 3 were objected to as being of improper dependant form. As set out above, these claims have been cancelled, rendering this objection moot.

Claims Rejection - 35 U.S.C. § 102(b)

(Claims 1-3, 6-10, 14, 23, 24 and 26)

Claims 1-3, 6-10, 14, 23, 24, and 26 were rejected under 35 U.S.C. § 102(b) as being anticipated by Begault (NASA-TM-102279 hereinafter "Techniques"). In making this rejection, the Examiner indicated that Techniques disclosed all limitations of the subject claims. As shown below, it is respectfully submitted that these Claims, as amended, are not anticipated by Techniques. Reconsideration is respectfully requested.

With respect to Claim 1, in making this rejection, Examiner Swerdlow concluded that Techniques included all the limitations of the stated claims. More specifically, it was stated:

"Techniques discloses a method of producing distinct spatial locations for incoming sounds (pp. 4-5; Fig. 3) comprising: receiving a first audio signal from a first source (Input #1); adding only a first differentiation cue (Td, g) to the first audio signal to produce a first stereo audio signal having a right first audio signal (top input of right summing amplifier) and a left first audio signal (top input of left summing amplifier); receiving a second audio signal from a second source (Input #2); producing a second stereo audio signal having a right second audio signal (middle input of right summing amplifier) and a left second audio signal (middle input of left summing amplifier); providing the right first audio signal and the right second audio signal to a right audio transducer (Right speaker); providing the left first audio signal and the left second audio signal to a left audio transducer (Left speaker). Techniques further discloses that the respective input signals 'are heard in ... distinctly different spatial locations' (i.e. allow a user to more easily distinguish the audio signals) (p.4) and no signal flow

from the stereo signal back to the inputs.

Applicant respectfully submits that each of the elements of the subject claims are not disclosed in Techniques as is stated by the Examiner.

Techniques is a paper that reviews various techniques for “manipulating the spatial element of sound,” such that the signals are perceived to be heard in distinctly different spatial locations. (p. 3). It does not, however, indicate that the intelligibility of all of these sounds, when simultaneously present, is improved when manipulated. This reference is concerned with hearing a desired signal over a non-desired signal, otherwise known as a “masker.” (p. 14).

The invention, as set out in the subject Claims, is distinct from Techniques. All of the independent claims, Claims 1, 7, 14, 23 and 24, have been amended to include the limitation that differentiation cue allows the listener to simultaneously hear and understand each signal without degradation to the intelligibility of any other signals. No new matter has been added. In other words, the method as set out in the subject claims requires that intelligibility of the various sounds do not degrade while allowing the listener to hear and understand those signals.

In contrast, as set out above, Techniques indicates that the signals are heard in different spatial locations. It does not teach or otherwise disclose the simultaneous hearing and understanding of multiple signals without degradation to the intelligibility of these signals. (See also, U.S. Pat. No. 5,438,623 issued to Begault, Col. 2, Lines 3-23).

Therefore, per the above Remarks and amendments, this Claim cannot be considered anticipated by Techniques. Reconsideration is respectfully requested.

With respect to Claims 2 and 3, these claims have been cancelled, rendering this rejection moot.

With respect to Claim 6, this claim has been cancelled and rewritten as new Claim 27, and depends from Claim 1. It includes the limitation that the differentiation cue comprises a channel separation in the form of only an amplitude difference of at least 3 dB. As set out above, Techniques is not directed to the simultaneous hearing and understanding of multiple signals without degradation to these signals. Accordingly, this Claim is not anticipated by Techniques.

Moreover, the differentiation cue of Claim 6, includes only an amplitude difference. As is set out below, Techniques does not disclose a differentiation cue that utilizes only an amplitude difference, the Claim is not anticipated by this reference.

Techniques discloses the use of the method that involves the manipulation of the location of a sound source, referred to as "*Localization*". (p. 3-4). As taught by Techniques, *Localization* relies upon the differences between the amplitude of the sounds in combination with the differences with the time differences of those sounds. As stated in Techniques:

"Figure 3 illustrates how ILD [amplitude difference] and ITD [time difference] can be combined to produce three distinct spatial locations for incoming sounds." (p. 4)

The requirement of having both gain and a time delay is further shown by the caption for Figure 3, the figure relied upon by the Examiner in making the present rejection, which states: "Circuit scheme combining ITD and ILD lateralization techniques to spatially separate three inputs (e.g. radio transmission)." (Emphasis Added). Additionally, the time/gain combination

requirement is shown in Techniques during a discussion of the implementation of the ITD/ILD processing algorithm, which states:

“It is relatively easy to implement a ITD/ILD digital signal processing algorithm based on the data of figure 1. For example, consider placing a signal at the extreme left position in the head. We derive the left and right channel outputs from an input signal by multiplying by a gain factor “g” for ILD and by delaying the input signal by “t” for ITD.” (Equations omitted).

Accordingly, this method requires both an amplitude difference and a time difference must be present. Otherwise, without both being present, this method fails to manipulate any sound source. It should also be noted that while Techniques identified *Lateralization* as one method for attaining spatial positions of signals, such method was “severely limited when they are compared to spatial hearing in the real world.”

The present invention, as set out in Claim 6, includes the limitation of having the differentiation cue being a channel separation in the form of only an amplitude difference of at least 3 dB between the right first audio signal and the left first audio signal. Accordingly, as set out above, due to Techniques not teaching or otherwise disclosing the use of only an amplitude difference being used as a differentiation cue, it is respectfully submitted that Claim 6 is not anticipated by Techniques. Reconsideration is requested.

With respect to Claim 7, this claim includes the limitation of a differentiation cue including only an amplitude difference, along with the limitation that differentiation cue allows the listener to simultaneously hear and understand each signal without degradation to the intelligibility of any

other signals. Thus, per the above Remarks and amendments, this Claim cannot be considered anticipated by Techniques. Reconsideration is respectfully requested.

With respect to Claims 8, 9 and 10 they have been cancelled and rewritten as new claims 28, 29 and 30, and depend from Claim 7. Due to their dependence from Claim 7, such claims cannot be considered anticipated by Techniques. Reconsideration is respectfully requested.

With respect to Claim 14, 23 and 24, such claims include the limitations as set out above. Accordingly, per the above Remarks and amendments, these Claims cannot be considered anticipated by Techniques. Reconsideration is respectfully requested.

With respect to Claim 26, it has been cancelled and rewritten as new Claim 35, and depends from Claim 24. Due to its dependence from Claim 24, such claim cannot be considered anticipated by Techniques. Reconsideration is respectfully requested.

Claims Rejection - 35 U.S.C. § 103(a)

(Claim 11)

Claim 11 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Techniques in view of Maher (U.S. Pat. 6,111,958). In making this rejection, the Examiner indicated that Techniques discloses all elements of the subject claim except for a switch for bypassing the differentiation block. However, according to the Examiner, Maher discloses an audio spatial enhancement apparatus that bypass spatial enhancement processing upon detection of a bypass signal, (Fig. 1, reference 42; Col. 3, lines 34-36), and such would be obvious to combine with

Techniques.

As set out above, Techniques requires the combination of an amplitude difference and a time difference to manipulate the location of sound, and does not include the teaching of having a differentiation cue that allows the listener to simultaneously hear and understand each signal without degradation to the intelligibility of any other signals.

With respect to Claim 11, it has been cancelled and rewritten as new Claim 31, depending from Claims 7 and 9. As such, as provided above, new Claim 31 includes the limitation of a differentiation cue including only an amplitude difference, along with the limitation that differentiation cue allows the listener to simultaneously hear and understand each signal without degradation to the intelligibility of any other signals. Thus, per the above Remarks and amendments, Techniques does not include all the elements of this claim except for a switch, and thus cannot be considered obvious in light of the Techniques in view of Maher. Reconsideration is respectfully requested.

Moreover, Maher discloses a bypass that allows for the selection of the original unmodified signal or a modified signal. In contrast, the subject claim is directed toward a system that turns off one signal when another signal is detected, as evidenced by the limitation, "the switch being responsive to a detection signal produced by the detector and opening when a signal is detected." In essence, the present claim limitation is a muting function. It is not a bypass. Thus, it is respectfully submitted that the combination of Techniques and Maher would not render the subject claim obvious.

Accordingly, it is submitted the subject claim are not disclosed by the combination of these references. Thus, Claim 31 is not rendered obvious by the combination of these references. Reconsideration is respectfully requested.

Claims Rejection - 35 U.S.C. § 103(a)

(Claims 12 and 13)

Claims 12 and 13 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Techniques in view of Shamma (U.S. Pat. 3,848,092). In making this rejection, the Examiner indicated that Techniques discloses all elements of the subject claim except for resistive voltage divider for providing a differential cue. However, according to the Examiner, Shamma discloses an audio spatial enhancement apparatus that uses a resistive voltage divider to create spatial effects (Fig. 2, reference 46; Col. 2, lines 25-28; Col. 3, lines 2-7), and such would be obvious to combine with Techniques.

As set out above, Techniques requires the combination of an amplitude difference and a time difference to manipulate the location of sound, and does not include the teaching of having a differentiation cue that allows the listener to simultaneously hear and understand each signal without degradation to the intelligibility of any other signals.

With respect to Claims 12 and 13, they have been cancelled and rewritten as new Claims 32 and 33, depending from Claim 7. As such, as provided above, new Claims 32 and 33 includes the limitation of a differentiation cue including only an amplitude difference, along with the

limitation that differentiation cue allows the listener to simultaneously hear and understand each signal without degradation to the intelligibility of any other signals. Thus, per the above Remarks and amendments, Techniques does not include all the elements of this claim except for a switch, and thus cannot be considered obvious in light of the Techniques in view of Shammar. Reconsideration is respectfully requested.

Accordingly, it is submitted the subject claim are not disclosed by the combination of these references. Thus, Claims 32 and 33 are not rendered obvious by the combination of these references. Reconsideration is respectfully requested.

Claims Rejection - 35 U.S.C. § 103(a)

(Claims 18-22)

Claims 18-22 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Slater (USPN 4,941,187) in view of Begault (U.S. Pat. 5,438,623). In making this rejection, the Examiner indicated that Slater discloses all elements of the subject claims except for the application of differentiation cues to the audio inputs to produce differentiated left and right channels to create an impression that the associated sounds originate from different psychoacoustic locations. However, according to the Examiner, Begault discloses the application of digital filters to a plurality of aircraft audio inputs to differentiate them by making them appear to come from separate and discrete positions, and such would be obvious to combine with Slater.

It is submitted that the combination of these references do not disclose the present invention

as set forth in the subject claims, as amended. Claim 18 has been amended to include the element that the differentiation cues to allow the listener to simultaneously hear and understand each signal without degradation to the intelligibility of any other signals. In contrast, as set out above, neither Slater nor Begault teach nor suggest this element. Slater is not concerned with simultaneously hearing and understanding each signal, as shown by it being directed to a partial mute system. Begault is equally not concerned with simultaneous intelligibility of the signals, as shown by it being directed toward placing signals only in different spatial locations, without any discussion as to the degradation to these signals.

Additionally, Slater combines all the input signals into combined right and left outputs. (Figs. 1 and 5 reference numbers 54, 56a, 56b). Begault, in contrast, keeps each source separate and utilizes a different differentiation cue for each source. (Fig. 1, reference numbers 16(1)-(4)) Begault does not teach the combination of any signal. It is directed toward application of a complex head related transfer function, which is not compatible with the combination of all inputs into left and right outputs.

Claim 18, however, involves the combination of certain signals into a single position (combining the plurality of microphone inputs producing a front microphone signal), while keeping other signals in other positions (first communication signal, second communication signal). Each signal is then subjected to differentiation cues. Thus, while Slater combines all input signals and Begault does not combine any signal, Claim 18 combines some signals, but does not combine others. Accordingly, the combination of Slater with Begault would not produce such

a system. It is, therefore, submitted that the combination of these references would not render Claim 18, or Claims 19-22 obvious.

Accordingly, there is no motivation, teaching or suggestion to combine Slater with Begault, nor would a combination of Slater and Begault include all the elements of the Claim 18, as amended. Thus, the present invention as set forth in Claim 18 is not rendered obvious. Furthermore, as Claims 19-22 are dependant upon Claim 18, none of these Claims are rendered obvious. Reconsideration of this rejection is respectfully submitted.

Claims Rejection - 35 U.S.C. § 103(a)

(Claim 25)

Claim 25 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Techniques in view of Sommer (U.S. Pat. 4,434,508). In making this rejection, the Examiner indicated that Techniques discloses all elements of the subject claim except for differentiation by differential frequency gain. However, according to the Examiner, Sommer discloses an audio spatial enhancement apparatus that uses differential frequency gain to differentiate signals, (Fig. 1, reference 40; Col. 4, line 60 – Col. 5, line 5), and such would be obvious to combine with Techniques.

As set out above, Techniques requires the combination of an amplitude difference and a time difference to manipulate the location of sound, and does not include the teaching of having a differentiation cue that allows the listener to simultaneously hear and understand each signal

without degradation to the intelligibility of any other signals.

With respect to Claim 25, it has been cancelled and rewritten as new Claim 34, depending from Claim 7. As such, as provided above, new Claim 34 includes the limitation of a differentiation cue including only an amplitude difference, along with the limitation that differentiation cue allows the listener to simultaneously hear and understand each signal without degradation to the intelligibility of any other signals. Thus, per the above Remarks and amendments, Techniques does not include all the elements of this claim except for a switch, and thus cannot be considered obvious in light of the Techniques in view of Sommer. Reconsideration is respectfully requested.

With respect to Sommer, it discloses a system having signals that are initially combined and then separated by use of a filter. There is no disclosure, teaching or motivation to take initially separate signals and then combine such in order to later differentiate them. The method disclosed in Techniques, however, is directed toward signals that are initially separate and then combined and differentiated by the combination of amplitude difference and a time difference. The method disclosed in Techniques does not consider the inclusion of a filter to differentiate the signals. Thus, the Sommer reference is not analogous with the Techniques reference. Accordingly, one skilled in the art would not be motivated to combine these references.

Accordingly, it is submitted the subject claim is not disclosed by the combination of these references. Thus, Claim 34 is not rendered obvious by the combination of these


Application No. 09/320,349
Response to Office Action mailed July 13, 2006
Attorney Docket P1681/852-01

references. Reconsideration is respectfully requested.

Based on the above, and the prior responses filed herein, Applicant respectfully submits that the application is in condition for registration and reconsideration is requested. If the Examining Attorney has any questions or comments or if further clarification is required, it is requested that he contact the undersigned at the below listed telephone number.

It is understood that an extension of time is required. Please consider this paper to be such a request. Also, attached is the extension of time fee. Should a fee deficiency have occurred, please contact the undersigned.

Respectfully submitted,


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